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ABSTRACT

To compare the effectiveness of an experimental correlated, combined aural-visual remedial reading instructional approach with that of a conventional, predominately visual approach, 90 adolescent retarded readers age 14 to 16 years, IQ 92 to 114, reading grade levels 7 to 9 were classified according to their sensory modality learning preferences and were exposed to the two remedial techniques three times a week for one semester. Results were that pupils in the experimental group receiving combined aural-visual instruction showed significantly greater growth in reading than did the pupils in the control group receiving predominately visual instruction. There was also a significant interaction between pupils' sensory modality learning preferences and the relative effectiveness of the sensory teaching approach used. The experimental approach appeared to be more effective with auditory learners and learners with no sensory modality learning preference, while the control approach was more effective with visual learners. (JD)

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Abstract

Sensory Mode of Lesson Presentation as a Factor
in the Reading Comprehension Achievement of
Adolescent Retarded Readers

This study compared the effectiveness of an experimental correlated, combined aural-visual remedial reading instructional approach with that of a conventional, predominantly visual approach in improving the reading comprehension of adolescent retarded readers. Moreover, it investigated the relative effectiveness of each teaching approach in terms of its interaction with the various sensory modality learning preferences (auditory, visual, or neither) of pupils in the study sample.

Students who met the prescribed criteria of age 14.0 to 16.0 years, IQ 84 to 116 S.L.I., reading grade levels 7.0 to 9.0 (one to three years reading retardation), and normal vision and hearing, were classified according to their sensory modality learning preferences, and then divided into experimental and control groups.

Pupils in the experimental group receiving combined aural-visual instruction showed significantly greater growth in reading than did the pupils in the control group receiving predominantly visual instruction. In addition, there was a significant interaction between pupils' sensory modality learning preferences and the relative effectiveness of the sensory teaching approach used. The experimental approach was more effective with auditory learners and learners with no sensory modality learning preference, while the control approach was more effective with visual learners.

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EFFECT SIZE OF LARGE PRESENTATION AS A FACTOR IN THE READING COMPREHENSION PERFORMANCE OF ADOLESCENT RETARDED READERS

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Sensory Mode of Lesson Presentation as a Factor in the Reading Comprehension Improvement of Adolescent Retarded Readers

The purpose of this study was to compare a remedial reading instructional program that used a combined, correlated aural-visual approach with a program that used a predominantly visual approach only, with reference to their effectiveness in improving the reading comprehension of adolescent retarded readers who differed in their preferred sensory mode of learning.

The following hypotheses were proposed:

1. Adolescent retarded readers who are taught by a combined aural-visual approach will achieve greater growth in reading comprehension than those who are taught by a predominantly visual approach.
2. There will be a relation between sensory modality learning preference and the relative effectiveness of different sensory modality emphases of instruction with reference to the improvement of the reading comprehension of adolescent retarded readers.
    a. The combined aural-visual approach will be more effective in improving the reading comprehension of auditory learners and learners with no sensory modality learning preference than it will be in improving the reading comprehension of visual learners.
    b. The predominantly visual approach will be more effective in improving the reading comprehension of visual learners than it will be in improving the reading comprehension of auditory learners and pupils with no sensory modality learning preference.

The rationale for the study is based on the following concepts:

1. Effective reading comprehension involves effective thinking.
2. Procedures that will improve thinking should help to improve reading comprehension.
3. Listening instruction is an efficacious approach to utilize for development of thinking skills involved in verbal comprehension because of the opportunities it affords for immediate discussion and feedback of responses.
4. Effective listening and effective reading entail many of the same thinking processes. Therefore, instruction in the thinking skills necessary for developing effective listening comprehension should be useful for building a background for follow-up development of the same comprehension skills in reading.
5. It is highly probable that training and proficiency in verbal comprehension skills will transfer across from listening to reading.
6. Pupils appear to differ in their sensory modality learning preferences. Therefore, to meet individual needs in this regard, both the aural and the visual modes of lesson presentation should be used by the teacher.
7. Teaching should take advantage of pupils' strengths to help them develop their weaker faculties. Therefore, teachers of retarded readers who lack proficiency in visual skills of verbal comprehension should utilize the pupils' aural capacities in this respect to improve their skills in reading.

A review of the literature related to the investigation supported these propositions. Specifically, theoretical constructs and empirical

evidence were studied in regard to the following questions: what is the relation between reading and listening? Can and should listening skill, like reading skill, be increased through training? What is the effect, if any, of instruction in listening upon reading ability? Does training in one area transfer over to the other? What role, if any, do sense modality learning preference and auditory-visual integration play in regard to listening/reading instruction?

The information disclosed in the theoretical, descriptive, and experimental literature included the following important points:

1. Reading and listening are closely related, but not identical skills. Both are communication skills involving the reception and assimilation of verbal information. Both involve similar thought processes.
2. Listening instruction is both a feasible and an important undertaking. Nevertheless, instruction in listening has been neglected in our schools, at all levels of the educational continuum.
3. Transfer of training across sense modalities can and does occur. Training in listening can transfer across to increased proficiency in reading.
4. In the general area of aural vs. visual presentations of material as related to learning efficiency, research findings have been divergent, often conflicting. However, the importance of auditory-visual integration in reading competency has been demonstrated.
5. The role of sense modality learning preference in respect to listening/reading instruction has not been studied sufficiently to yield definitive findings.

Research Design and Methodology

Tenth-grade students in a comprehensive suburban high school were selected as the population from which the study sample was to be drawn. The cumulative record cards of all tenth-grade pupils were surveyed in order to screen out, initially, those students within the prescribed age range of 14.0 to 16.0 years whose reading test scores fell below the median percentile on a group standardized reading test administered as part of a routine school-wide testing program of all sophomores. A below-median score in reading was considered an indicator of possible reading retardation. On this basis, 196 pupils were initially identified for possible inclusion in the experiment.

The California Short-Form Test of Mental Maturity, Secondary Level, Form A, Non-Language Section[1] was administered to all such identified pupils, in order to obtain for each one an intelligence quotient and an intelligence grade placement level converted from his mental age. Only pupils within the average I.Q. range of 92 to 116 were eligible for participation in the investigation. This procedure brought the number of possible participants to 167.

The California Reading Test, Advanced Level, Form W, Comprehension Section[2] then was administered to those pupils within the prescribed I.Q. range of 92 to 116, in order to establish the amount of reading retardation in terms of discrepancy between a pupil's intelligence grade placement level and his current reading comprehension level. Only pupils retarded in reading one or more years below

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[1]Willis W. Clark and Ernest W. Tiegs, California Short-Form Test of Mental Maturity, Secondary, Grades 9 to 12, Form A (Monterey, California: California Test Bureau, 1937).

[2]E. Tiegs and W. Clark, California Reading Test, Advanced, Grades 9 to 14, Form W (Monterey, California: California Test Bureau, 1937).

their intelligence grade placement levels, but limited to reading comprehension grade levels 7.0 to 9.0, were eligible for inclusion in the study sample. The number of pupils meeting these criteria was 150.

The health record cards of all potential subjects for the study were screened for information regarding gross visual or auditory defects. Only pupils with normal or corrected-to-normal vision and with normal hearing were acceptable for inclusion in the investigation. No potential subjects had to be dropped because of such defects.

The Sequential Tests of Educational Progress (1957), Reading Test, Form 2A and Listening Test, Form 2A,[3] were administered to the 150 pupils selected, on the basis of the above procedures, for possible participation in the study. A comparison was made for each pupil between his score on the reading test and his score on the listening test, according to directions in the test manuals. In order to determine if a pupil was a visual learner (i.e., had a visual modality learning preference), an auditory learner (i.e., had an auditory modality learning preference), or showed no sensory modality learning preference. This information was used for classifying and dividing the pupils into sensory modality preference groups, with the resulting identification of 36 visual learners, 60 auditory learners, and 50 learners with no sensory modality learning preference.

From each of the three sensory modality preference groups, 30 pupils were randomly selected, so that there was a sub-sample of 30 visual learners, a sub-sample of 30 auditory learners, and a sub-sample of 30 learners with no sensory modality learning preference. For a

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[3] Sequential Tests of Educational Progress, Reading, Form 2A and Listening, Form 2A (Princeton, New Jersey: Educational Testing Service, 1957).

total sample of 90 pupils. Equal numbers of each type of learner were randomly assigned to each of the two treatment groups so that there was a total of 45 pupils in each treatment group, one-third of whom were auditory learners, one-third of whom were visual learners, and one-third of whom had no sensory modality learning preference. Finally, treatments, the experimental combined aural-visual approach and the control predominantly visual approach, were randomly assigned to the treatment groups. The resulting 2 x 3 design paradigm is shown in Table 1.

TABLE 1

ASSIGNMENT OF SUBJECTS TO EXPERIMENTAL CONDITIONS

Sensory Type of Learner	Treatments	
	Combined Aural-Visual (Experimental)	Predominantly Visual (Control)
Auditory	15	15
Visual	15	15
No Preference	15	15
Total	45	45

In order to determine if there was comparability among the groups on the variables of chronological age, I.Q., pretest reading grade level, and pretest amount of reading retardation, t tests were used to analyze the data. The t tests were computed for the differences between the highest and lowest means of the groups with respect to each of the above-mentioned four measures, using the .05 level as the criterion for significance. The results of the t tests yielded no significant

differences between the pairs of exam analyses; therefore, it was inferred that there was comparability among the groups on each of the four pretest variables.

The experimental group consisted of three classes of fifteen pupils each, for a total of forty-five pupils, who met for remedial reading instruction three times a week, for one semester, for forty-five minute periods each session. This group followed a comprehensive program of correlated listening comprehension and reading comprehension lessons. The selections used in the listening lessons were completely aural, with all selections, questions, and discussions involving listening only. Specific skills involving literal understanding, interpretation, and critical evaluation were covered. The reading lessons used by the experimental group followed on a one-to-one relationship, the comprehension skills and sub-skills of the listening comprehension lessons, but they involved materials that were presented visually and thus had to be read, as well as questions that had to be read. The reading selections used in these lessons were found in or adapted from the same sources as were used for the listening lessons.

The control group also consisted of three classes of fifteen pupils each, for a total of forty-five pupils, who met for remedial reading instruction three times a week, for one semester, for forty-five minute periods each session. This group followed a comprehensive program of reading lessons only, lessons designed to develop the same skills of comprehension involving literal understanding, interpretation, and critical evaluation as were covered in the combined aural-visual instruction of the experimental group.

Two of the three weekly reading lessons of the control group were visual parallels of the two weekly listening lessons of the experimental group. They were based on the same content as the latter,

but were presented visually. The third weekly reading lesson of the control group contained material identical to that in the experimental group's third weekly lesson, which also was a reading lesson. Thus, the control group's three weekly reading lessons were comprised of the same verbal materials as were presented to the experimental group in its three (two listening and one reading) weekly lessons. However, format of lesson plan and lesson presentation differed because of differences in sensory mode of instruction.

At the end of the semester, all pupils who participated in the investigation were given the California Testing Test, Advanced level, Form X as a posttest (Form W had been used as the pretest), in order to determine the amount of gain in reading comprehension. These gain scores were analysed to test the hypotheses of the experiment, using a 2 x 3 factorial analysis of variance. To test hypothesis one, the treatment main effect ratio was computed, with the .05 level of significance, in the direction of the experimental group, used as the criterion for confirming the hypothesis. To test hypothesis two, the interaction F ratio was computed and considered for significance at the .05 level.

This analysis of the data revealed a significant difference in the amount of reading growth between pupils in the experimental and control groups in favor of the experimental group, thereby upholding hypothesis one. Although both teaching approaches produced gains in reading comprehension, the increments resulting from the aural-visual approach were significantly greater than the increments resulting from the predominantly visual approach.

The F ratio obtained for interaction of teaching method and sensory modality learning preference was significant beyond the prerequisite .05 level, thereby upholding hypothesis two. Since the F ratio

for this interaction was significant beyond the prerequisite .05 level, the test for individual mean comparisons was used to determine if there were significant differences between specific means as hypothesized in 2a. and 2 b. Using the .05 level for significance, it was determined that there were significant differences between the subgroups as predicted. Therefore, hypotheses 2a. and 2b. were upheld. Under the experimental, combined aural-visual teaching approach, the mean difference score for the auditory learners was significantly greater than the mean difference score for the visual learners; the mean difference score for the learners with no sensory modality learning preference was greater than the mean difference score for the visual learners. Under the control, predominantly visual approach, the mean difference score for the visual learners was significantly greater than the mean difference scores of both the auditory learners and the learners with no sensory modality learning preference.

Discussion of Results

On the basis of the above findings, it was concluded that when sensory modality learning preference is not considered (as in hypothesis one), the use of a correlated, combined aural-visual approach is more effective than a predominantly visual approach for improving the reading comprehension of adolescent retarded readers. The results appear to bear out the investigator's contention that because the listening situation lends itself to thorough on-going discussion and analysis of the thinking that is going on in responding to verbal material listened to, and can include both direction of thinking and immediate feedback of the products of thinking by the instructor leading the discussion, instruction in listening makes a logical starting point for the development of the same verbal comprehension skills needed in reading. The effectiveness of the present study's planned and systematic

presentation of listening skills followed by presentation of the parallel reading skills in a correlated sequence of verbal comprehension lessons probably can be attributed to the kind of conscious attention to transfer advocated by Edgar Dale who noted:

> ...communication uses a multi-media approach. The language modes are interrelated. If you improve one medium...you tend to improve the others. But conscious attention to transfer can sharply improve learning.[4]

The results also appear to bear out the investigator's premise that the relative effectiveness of a remedial reading instructional approach, in terms of its sense modality emphasis, is contingent upon the sensory modality learning preferences of the retarded readers in question. Because of individual differences in modality preference, some adolescent retarded readers do better with material to which they listen, while others do better with material that they read. By using a correlated listening/reading approach in remedial reading instruction for the former (auditory learners and learners with no particular modality preference), i.e., by using the aural avenue to introduce, clarify, and give practice in the skills of comprehension of verbal matter before requiring the students to cope with the reading of similar material, the teacher will be effectively utilizing their aural capacities in verbal comprehension to improve their reading comprehension. With those adolescent retarded readers who have a visual modality learning preference, this does not seem to be as effective, and indeed, is not as effective as a predominantly visual teaching approach. This differentiation of teaching procedures makes use of the individual pupil's strength and proceeds from there to develop his reading capacity.

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[4]Edgar Dale, "On the Frontiers of Reading," Vistas in Reading, ed. J.A. Figurel, Proceedings of the International Reading Association (1966), p. 15.

It is hoped that teachers, supervisors, and reading specialists, who are in a position to implement new techniques, will be helped by the results of this study which indicate that the use of the combined aural-visual approach was a profitable undertaking in regard to improving the reading comprehension of adolescent students already deficient in that skill. If a pupil reaches high school still a retarded reader (and often retarded in reading despite a long-term effort by the elementary and even junior high school at remediation), it seems apparent that a change of teaching technique is in order. Continuing the same type of predominantly visual reading instruction as previously used with such unsuccessful pupils would be pursuing an unprofitable course.

Aside from increased interest and motivation accruing from the use of a new way of presenting material, it appears that the aural-aural aspects of listening/thinking activities,that entail thinking processes also germane to reading,develop patterns of thought and comprehension that transfer over to reading activities and thus to improved reading comprehension. In view of this, reading specialists and supervisors responsible for remedial reading programs should attempt to incorporate a combined, correlated aural-visual instructional approach into the high school remedial reading program, in an effort to provide a more fruitful teaching procedure.

The results of the study in regard to differentiation of sensory modality learning preferences of pupils, and the interaction of this preference with teaching approach have important implications for remedial reading instruction in terms of differentiation of teaching procedures cued to pupils' learning modes. It would be best to test pupils for determination of individual sensory modality learning preference before beginning a program of remedial reading instruction with

them, so that the teacher could map out a program that would meet his pupils' learning needs on a differentiated basis in terms of a combined aural-visual approach or a predominantly visual approach. Pupils then could be taught by the sensory emphasis approach most productive for them. If the modality learning preferences of the pupils are not known (as very often is the case in the ordinary school situation where it is not common to screen for such a variable), the remedial reading teacher should utilize both the aural and visual modes, in a combined, integrated, correlated, structured manner, in order to assure servicing his pupils' learning needs.

In view of the positive results obtained with the experimental teaching approach utilized in this study, it is suggested that the same instructional technique be applied in other school settings to determine its efficacy therein. This refers to elementary and junior high schools, as well as to schools in inner city areas. It would also be profitable to replicate the study on a non-retarded reader population, to explore whether or not the combined aural-visual approach to developmental reading is more beneficial than is the conventional predominantly visual approach. At the same time, the interaction of sensory modality learning preference and sensory teaching approach could be determined in regard to pupils who are not experiencing reading difficulties.